

Mitral Stenosis

Mitral narrowing (stenosis) (narrowed heart valve) is usually from rheumatic fever damage. Atrial fibrillation (an irregular, quivering heartbeat) (chaotic heartbeat) raises stroke risk sharply. Balloon valvuloplasty (stretching the valve open with a balloon) can help.

THE ONE-LINE TRUTH

The mitral valve is too narrow, so blood backs up into the lungs.

The chain — how it unfolds

1. The scarred mitral valve narrows, blocking blood flow from left atrium to left ventricle. — why: Rheumatic fever scars and fuses the valve flaps together, shrinking the opening from dime-size to pinhole-size so blood cannot flow through easily.
2. Pressure builds up in the left atrium and backs into the lungs. — why: Blood piles up behind the narrow valve like cars behind a closed gate, raising pressure in the left atrium; that pressure transmits backward into the pulmonary veins and lung capillaries.
3. Fluid leaks into the air sacs, causing shortness of breath (pulmonary swelling (edema)). — why: High pressure in the lung capillaries forces fluid out through the vessel walls into the air sacs (alveoli), making it hard to breathe—especially with exercise, lying flat, or fast heart rate.
4. The left atrium stretches and starts firing chaotic signals (atrial fibrillation). — why: Chronic high pressure and scarring remodel the atrium's electrical system, creating disorganized circuits that cause a rapid, irregular heartbeat instead of a steady rhythm.
5. Blood swirls slowly in the quivering atrium and clots form. — why: In atrial fibrillation (an irregular, quivering heartbeat), the atrium quivers instead of squeezing, so blood pools and stagnates—especially in a pouch called the left atrial appendage—allowing clots to form like sediment in still water.
6. Clots break loose and travel to the brain, causing stroke. — why: A clot that forms in the left atrium can break off, ride the bloodstream out through the aorta, and block an artery in the brain, cutting off oxygen and causing a stroke.

7. Chronic high pressure in the lungs stiffens the blood vessels (pulmonary high blood pressure (hypertension)). — why: Long-term high pressure damages and thickens the walls of the lung arteries, making them stiff and narrow, which forces the right heart to pump even harder.
8. The right ventricle pumps harder and harder, then weakens and fails. — why: The right ventricle muscle thickens to overcome the high lung pressure, but eventually it cannot keep up; the muscle stretches, weakens, and fails to pump blood forward, causing fluid to back up into the body (swollen legs, liver congestion).

Spot it — what you see, and why

- A low, rumbling sound (murmur) happens in the middle of the heart's relaxation phase, best heard at the apex (the pointy tip of the heart at the lower left of your chest): The mitral valve (the gate between the heart's upper-left and lower-left rooms) is stiff and narrow, so when the left atrium (the top-left room) squeezes blood through it into the left ventricle (the bottom-left pumping room), the blood has to rush through a tight space—like blowing through a narrow straw—and that rushing makes the rumbling sound.
- An opening snap (a sharp extra click right after the second heart sound): The stiff, scarred mitral valve leaflets (the two flaps of the gate) pop open suddenly when the pressure in the left atrium pushes them apart, making a snapping noise—like opening a stiff, stuck door quickly.
- The first heart sound (S1) is very loud: The mitral valve leaflets are still flexible enough to slam shut hard when the left ventricle squeezes, so the closing makes a louder-than-normal thump—like a heavy door banging shut.
- Shortness of breath, especially with activity or when lying flat: The narrow mitral valve acts like a dam, blocking blood from flowing smoothly from the lungs into the left side of the heart. Pressure backs up into the lungs (pulmonary congestion), and fluid leaks into the tiny air sacs, making it hard to breathe—like trying to breathe through a wet sponge.
- Irregular, fast heartbeat (often atrial fibrillation (an irregular, quivering heartbeat)): The left atrium swells and stretches because it has to work extra hard to push blood through the tight valve. The stretched muscle becomes electrically unstable, and the heart's rhythm goes haywire—the atrium quivers instead of beating in a steady pattern.
- Coughing, sometimes with pink, frothy spit or blood-tinged mucus (hemoptysis): High pressure in the lung blood vessels (from the backup of blood) can cause small vessels to leak or even burst, or it can trigger the lungs to produce extra mucus that mixes with a bit of blood.

Red flags — act now

- New or sudden severe shortness of breath at rest (may mean the valve has gotten much tighter or fluid is flooding the lungs)
- Chest pain, one-sided weakness, trouble speaking, or sudden vision loss (may mean a blood clot from the heart has traveled to the brain or another organ)
- Coughing up blood or pink frothy spit (means pressure in the lungs is dangerously high)
- Swelling in the legs or belly that is new or getting worse fast (means the right side of the heart is starting to fail)

Treat it — in this order

1. Anticoagulation with warfarin (target INR 2.0–3.0) or a direct oral anticoagulant (DOAC) if atrial fibrillation (an irregular, quivering heartbeat) is present → Thins the blood to stop clots from forming in the irregular, slow-moving left atrium. Prevents strokes caused by clots traveling to the brain. Warfarin is preferred if the valve is severely narrowed; DOACs may be used in milder cases per current ACC/AHA guidelines.
2. Diuretics (furosemide 20–80 mg daily) to remove excess fluid → Pulls water out of the blood through the kidneys, lowering the volume of blood the heart must pump. Reduces pressure backed up into the lungs and eases shortness of breath and leg swelling.
3. Beta-blocker (metoprolol 25–100 mg twice daily) or non-dihydropyridine calcium-channel blocker (diltiazem) to slow heart rate → Slows the heart rate so the left atrium has more time to squeeze blood through the tight valve opening during each beat. This lowers pressure buildup in the atrium and lungs. Target heart rate is 60–80 beats per minute at rest.
4. Percutaneous mitral balloon valvuloplasty (PMBV, also called balloon commissurotomy) → A balloon catheter is threaded into the heart and inflated inside the mitral valve to crack open the fused leaflets. This directly widens the opening, lowers the pressure gradient across the valve (goal < 5 mmHg mean), and relieves lung congestion. Works best if leaflets are flexible (Wilkins score ≤ 8) and no heavy calcium deposits.
5. Mitral valve replacement (surgical) with mechanical or bioprosthetic valve → Removes the scarred, stuck valve and replaces it with a working one (mechanical metal or tissue bioprosthetic). Permanently restores normal blood flow from left atrium to left ventricle and eliminates the pressure gradient. Recommended if balloon valvuloplasty is not possible (heavy calcium, rigid leaflets, Wilkins score > 8) or if severe mitral regurgitation is also present.

Your top priorities at the bedside

1. Monitor continuous cardiac rhythm on telemetry and immediately report new irregular heartbeat or heart rate above 110 beats per minute — why: Atrial fibrillation (an irregular, quivering heartbeat) happens suddenly in mitral narrowing (stenosis) when the stretched left atrium cannot maintain normal rhythm. Fast rates shorten the filling time through the narrow valve and cause flash pulmonary edema (fluid flooding the lungs) (sudden lung flooding). Clots can form in minutes.
2. Keep the patient in high Fowler position (sitting upright at 60 to 90 degrees) and give oxygen to maintain saturation above 92 percent — why: The narrowed mitral valve causes blood to back up into the lungs. Sitting upright uses gravity to pull fluid down and away from the lung air sacs so oxygen can get through. Low oxygen means the narrowing (stenosis) is decompensating.
3. Administer diuretics like furosemide exactly as ordered and track intake and output every hour, reporting urine less than 30 milliliters per hour — why: Diuretics remove the extra fluid backing up behind the narrowed (stenotic) valve. Hourly monitoring catches early kidney problems from poor forward flow through the valve. Weight loss of 1 to 2 pounds daily shows the drug is working.